

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (currently amended): A method for preparing a virtual three-dimensional representation of a first portion of a bone comprising the steps of:

obtaining, from a first orientation with respect to the first portion of the bone, first image data of the first portion of the bone;

obtaining, from a second, different orientation with respect to the first portion of the bone, second image data of the first portion of the bone;

generating a three-dimensional (3D) virtual representation of the first portion of the bone; and

displaying the 3D virtual representation of the first portion of the bone, the displayed 3D virtual representation having an orientation, the orientation of the displayed 3D virtual representation being determined using at least the difference between the first and second orientations from which the first and second image data were obtained,

wherein the displayed 3D virtual representation has a lower symmetry than the first portion of the bone.

Claim 2 (original): The method of claim 1, wherein at least one of the first and second images is a two-dimensional image.

Claim 3 (original): The method of claim 2, wherein both the first and second images are two-dimensional images.

Claim 4 (original): The method of claim 3, wherein at least one of the first and second images is a fluoroscope image.

Claim 5 (original): The method of claim 1, comprising: displaying an image of the first portion of the bone; and overlaying the displayed 3D virtual representation of the first portion of the bone and the image of the first portion of the bone.

Claim 6 (original): The method of claim 5, wherein the displayed image of the first portion

of the bone comprises at least some data from at least one of the first and second image data.

Claim 7 (original): The method of claim 5, comprising using an input device to adjust a dimension of the 3D virtual representation to correspond with a dimension of the first portion of the bone.

Claim 8 (original): The method of claim 7, wherein the dimension of the first portion of the bone is a diameter.

Claim 9 (original): The method of claim 7, wherein the dimension of the first portion of the bone is a length.

Claim 10 (canceled)

Claim 11 (currently amended): The method of claim [[10]] 1, wherein the displayed 3D virtual representation comprises a cylindrical portion.

Claim 12 (original): The method of claim 5, comprising: determining an intraoperative orientation of the bone; and wherein the orientation of the displayed 3D virtual representation of the first portion of the bone is indicative of the intraoperative orientation of the first portion of the bone.

Claim 13 (original): The method of claim 5, wherein the step of determining the intraoperative position of the first portion of the bone comprises: securing at least one of (a) a set of energy emitters or (b) a set of energy detectors to the first portion of the bone; and detecting, using the set of energy detectors, energy emitted by the energy emitters of the set of energy emitters.

Claim 14 (original): The method of claim 13, wherein, if the intraoperative orientation of the first portion of the bone changes, updating the orientation of the displayed 3D virtual representation of the first portion of the bone so that the orientation of the displayed 3D virtual representation remains indicative of the intraoperative orientation of the first portion of the bone.

Claim 15 (original): The method of claim 1, comprising the steps of: obtaining, from a third orientation with respect to a second portion of the bone, third image data of the second portion of the bone; obtaining, from a fourth, different orientation with respect to the second portion of the bone, fourth image data of the first portion of the bone; generating a three-dimensional (3D) virtual representation of the second portion of the bone; and displaying the 3D virtual representation of the second portion of the bone, the displayed 3D virtual representation of the second portion of the bone having an orientation, the orientation of the displayed 3D virtual representation of the second portion of the bone being determined using the difference between the third and fourth orientations from which the third and fourth image data were obtained.

Claim 16 (original): The method of claim 15, wherein the first and second orientations are the same as, respectively, the third and fourth orientations.

Claim 17 (original): The method of claim 15, comprising: displaying an image of the second portion of the bone, the displayed image of the second portion of the bone comprising at least some data from at least one of the third and fourth image data; and overlaying the displayed 3D virtual representation of the second portion of the bone and the image of the second portion of the bone.

Claim 18 (original): The method of claim 17, comprising using an input device to adjust a dimension of the 3D virtual representation of the second portion of the bone to correspond with a dimension of the second portion of the bone.

Claim 19 (original): The method of claim 18, wherein the dimension of the second portion of the bone is a diameter.

Claim 20 (original): The method of claim 18, wherein the dimension of the second portion of the bone is a length.

Claim 21 (original): The method of claim 1, wherein the displayed 3D virtual representation of the second portion of the bone has a lower symmetry than the second portion of the bone.

Claim 22 (original): The method of claim 21, wherein the displayed 3D virtual

representation of the second portion of the bone comprises a cylindrical portion.

Claim 23 (original): The method of claim 17, comprising: determining an intraoperative orientation of the second portion of the bone; and wherein the orientation of the displayed 3D virtual representation of the second portion of the bone is indicative of the intraoperative orientation of the second portion of the bone.

Claim 24 (original): The method of claim 23, wherein the step of determining the intraoperative position of the second portion of the bone comprises: securing at least one of (a) a set of energy emitters or (b) a set of energy detectors to the first portion of the bone; detecting, using the set of energy detectors, energy emitted by the energy emitters of the set of energy emitters.

Claim 25 (original): The method of claim 24, wherein, if the intraoperative orientation of the second portion of the bone changes, updating the orientation of the displayed 3D virtual representation of the second portion of the bone so that the orientation of the displayed 3D virtual representation of the second portion of the bone remains indicative of the intraoperative orientation of the second portion of the bone.

Claim 26 (previously presented): The method of claim 23, wherein the first portion and second portion of the bone are separated by a break and the method further comprises: manipulating at least one of the first and second portions of the bone with respect to the other; and observing the respective virtual representations of the first and second bones.

Claim 27 (original): A method for preparing a virtual three-dimensional representation of a first portion of a bone comprising the steps of:

obtaining, from a first orientation with respect to the first portion of the bone, first two-dimensional image data of the first portion of the bone;

obtaining, from a second, different orientation with respect to the first portion of the bone, second two-dimensional image data of the first portion of the bone;

generating, based on at least the first and second image data, a virtual representation of the first portion of the bone, the virtual representation having a lower symmetry than the first portion of the bone; and

overlaying, on a display device, (i) an image of the virtual representation of the first portion of the bone and (ii) an image of the first portion of the bone, wherein an orientation of the displayed virtual representation is indicative of an intraoperative orientation of the first portion of the bone.

Claim 28 (original): The method of claim 27, comprising: obtaining, from a third orientation with respect to a second portion of the bone, third two-dimensional image data of the second portion of the bone; obtaining, from a third, different orientation with respect to the first portion of the bone, fourth two-dimensional image data of the second portion of the bone; generating, based on at least the second and fourth image data, a virtual representation of the second portion of the bone, the virtual representation of the second portion of the bone having a lower symmetry than the second portion of the bone; and overlaying, on a display device, (i) an image of the virtual representation of the second portion of the bone and (ii) an image of the second portion of the bone, wherein an orientation of the displayed virtual representation of the second portion of the bone is indicative of an intraoperative orientation of the second portion of the bone.

Claim 29 (original): The method of claim 28, wherein the first and second orientations are the same as, respectively, the third and fourth orientations.

Claim 30 (original): The method of claim 27, wherein the step of generating comprises identifying a longitudinal axis of the displayed image of the first portion of the bone and wherein the image of the virtual representation of the first portion of the bone extends along the longitudinal axis of the displayed image of the first portion of the bone.

Claim 31 (original): A system configured to prepare a virtual three-dimensional representation of a first portion of a bone, the system comprising:
a display device; and
a processor in communication with the display device, the processor configured to:
receive first two-dimensional image data of the first portion of the bone, the first two-dimensional image data having been obtained from a first orientation with respect to the first portion of the bone;

receive second two-dimensional image data of the first portion of the bone, the second two-dimensional image data having been obtained from a second, different orientation with respect to the first portion of the bone;

generate, based on at least the first and second image data, a virtual representation of the first portion of the bone, the virtual representation having a lower symmetry than the first portion of the bone; and

overlay, on the display device, (i) an image of the virtual representation of the first portion of the bone and (ii) an image of the first portion of the bone, wherein an orientation of the displayed virtual representation is indicative of an intraoperative orientation of the first portion of the bone.